

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

**UNITED STATES PATENT AND TRADEMARK OFFICE**

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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

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Ex parte MITSUNORI SAKAMA

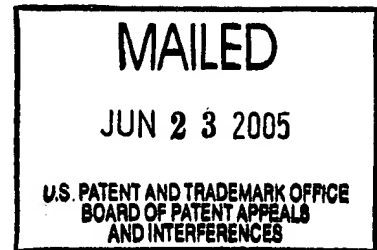
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Appeal No. 2005-0720  
Application No. 09/070,908

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HEARD: May 18, 2005

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Before GARRIS, WARREN, and JEFFREY T. SMITH, Administrative Patent Judges.  
JEFFREY T. SMITH, Administrative Patent Judge.

**DECISION ON APPEAL**

This is a decision on appeal from the examiner's final rejection of claims 23-29, 31-50 and 58-129, which are all of the claims pending in this application.

### BACKGROUND

The Appellant's invention relates to techniques for forming a thin film by a plasma CVD method, and particularly, to a technique for forming a silicon film by using the plasma CVD method. (Specification, p. 1). Appellant's claimed invention requires the overall flow rate of the gases, reactive and discharge gases, to be maintained during a transition from the reactive gas to the discharge gas.

Representative claim 26 appears below:

26. A film forming method comprising the steps of:  
supplying a discharge gas into a chamber;  
supplying a radio frequency energy in said chamber to generate plasma from said discharge gas by radio frequency discharge;  
supplying a reactive gas into said chamber at a same flow rate as supplying said discharge gas; and  
forming a semiconductor film over a substrate in said chamber by decomposing said reactive gas using said radio frequency energy, wherein the step of supplying said discharge gas is discontinued with a start of the step of supplying said reactive gas and throughout the step of forming of said semiconductor film,  
wherein an overall flow rate of gases supplied in said chamber is maintained during a transition from said discharge gas to said reactive gas, and  
wherein said discharge gas does not contribute to film formation.

The prior art references of record relied upon by the examiner in rejecting the appealed claims are:

Yamazaki et al. (Yamazaki)	5,313,076	May 17, 1994
Kaschmitter et al. (Kaschmitter)	5,346,850	Sep. 13, 1994
Mei et al. (Mei)	5,366,926	Nov. 22, 1994

Kozuka	5,420,044	May 30, 1995
Gupta et al. (Gupta)	5,456,796	Oct. 10, 1995
Yamazaki et al. (Yamazaki)	6,015,762	Jan. 18, 2000
Yamazaki et al. (Yamazaki)	6,281,147	Aug. 28, 2001
Gupta et al. (Gupta)	6,289,843	Sep. 18, 2001

Claims 23-29, 45-50, 58-59, 61-65, 67.82, 84-87 and 89-129 are rejected under 15 U.S.C. §103(a) as unpatentable over Kozuka in view of Gupta ('843 & '796); claims 60, 66, 83 and 88 are rejected under 35 U.S.C. §103(a) as unpatentable over Kozuka, in view of Gupta ('843 & '796) alone as applied above in claims 23-29, 45-50, 58, 59, 61-65, 67-82, 84-87 and 89-129, or further in view of Mei or Kaschmitter, or Yamazaki (076); claims 31-44 are rejected under 35 U.S.C. §103(a) as unpatentable over Kozuka in view of Gupta ('843 & '796) as applied to claims 23-29, 45-50 and 58-129 above, and further in view of Mei or Kaschmitter or Yamazaki (076); and claims 23-29, 45-50 and 58-129 are rejected under the judicially created doctrine of obviousness-type double patenting as unpatentable over claims 1-63, or claims 1-5, 12-21 and 27-30 of U.S. Patent No 6,281,147, or US. Patent No. 6,015,762, respectively in view of Gupta ('834), optionally in view of Kozuka. (Answer, pp. 5-15).

We affirm all of the rejections.

Rather than reiterate the conflicting viewpoints advanced by the Examiner and the Appellant regarding the above-noted rejections, we make reference to the Answer

(mailed October 7, 2004) for the Examiner's reasoning in support of the rejections, and to the supplemental Brief (filed June 11, 2004) and Reply Brief (filed December 8, 2004) for the Appellant's arguments there against.

We initially note that Appellant asserts that for purposes of appeal that the claims should stand or fall together. (Brief, p. 5). Accordingly, for each ground of rejection, all of the claims will stand or fall together and we will select a representative claim and limit our consideration thereto.

#### OPINION

##### Obviousness Rejections

We have carefully reviewed the claims, specification and applied prior art, including all of the arguments advanced by both the Examiner and Appellant in support of their respective positions. This review leads us to conclude that the Examiner's § 103 rejections are well founded. See *In re Oetiker*, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992); *In re Piasecki*, 745 F.2d 1468, 1471-1472, 223 USPQ 785, 787-788 (Fed. Cir. 1984).

Claims 23-29, 45-50, 58-59, 61-65, 67.82, 84-87 and 89-129 stand rejected under 15 U.S.C. §103(a) as unpatentable over the combined teachings of Kozuka and Gupta ('843 & '796). We affirm. We select claim 26 as representative of the rejected claims.

The Examiner has determined that the claimed subject matter is obvious over the combined teachings of Kozuka and Gupta ('843 & '796). (Answer, pp. 6-12).

Appellant argues that Kozuka, Gupta '843 and Gupta '796 either alone or in combination, do not teach, disclose or recognize the importance and significance of supplying reactive and discharge gases at a same flow rate where an overall flow rate of the gases is maintained during a transition from the reactive gas to the discharge gas or vice-versa. (Brief, p. 7-10).

We are not persuaded by Appellant's arguments. Kozuka teaches CVD deposition of multiple layer non nonmonocrystalline semiconductor devices using a single chamber processes (Note Embodiment 3, columns 9-10). The exemplified deposition of successive layers of amorphous silicon TFT (thin film transistors) occurs in a chamber wherein the plasma atmosphere is constantly maintained throughout the film formation process. Similarly, Gupta ('843 & '796) teach CVD deposition wherein the plasma atmosphere is constantly maintained throughout the film formation process. Gupta '843, column 5, discloses the flow rate of the inert gas and the reactive gas is substantially equal throughout the deposition process. Gupta '843 specifically states "[m]aintaining such a uniform gas flow between steps 220 [setting and maintain pressure] and 230 [transition between reactive and inert gases] provides for a more uniform deposition." (Col. 5, ll. 55-57). Thus, persons of ordinary

skill in the art at the time of Appellant's invention would have recognized the importance of establishing and maintaining constant gas flow rate, and plasma, during the deposition process, including the transition periods for the reactive gas to the discharge gas, to provide a more uniform deposition. A person of ordinary skill in the art would have recognized that a disruption in the flow of the gas would cause a disruption in the plasma atmosphere.

Appellant argues that in the presently claimed invention the discharge gas is not mixed with the reactive gas. However, Kozuka discloses that the raw material gas is preferably used not singly but as a mixture with a diluting gas during the film formation (column 4, lines 40-42). (Brief, pp. 10-11).

The gases described in claim 26 are not limited to the scope of Appellant's arguments. Claim 26 does not provide a description of the contents of the discharge gas and the reactive gas. That is, the claim does not specify that the gas excludes mixtures. Further, Appellant has not directed us to a portion of the specification that indicates that the use of mixture of gases is excluded for either the discharge gas or the reactive gas.

Appellant argues that while "Gupta '843 may teach that a rate during step 215 is substantially equal to a rate in step 230 in column 5, lines 45-49, it appears that none of the references, including Gupta '843, teach the features that an overall flow rate of gases supplied in the chamber is maintained during a transition from the

discharge gas to the reactive gas or from the reactive gas to the discharge gas.”

(Brief, p. 13).

We are not persuaded by Appellant’s arguments. A person of ordinary skill in the art would have recognized that the discussion of Gupta '843 appearing in column 5 would have suggested that the flow rate of the reactive and inert gases should be substantially equal so as to not disrupt the particles including during the transition periods for the inert gas to the reactive gas and to provide a more uniform deposition.

(Note Fig. 2 and column 5).

For the foregoing reasons and those set forth in the Answer, based on the totality of the record, we determine that the preponderance of evidence weighs in favor of obviousness, giving due weight to Appellant’s arguments in the briefs.

Accordingly, the Examiner’s rejection under 35 U.S.C. § 103 is affirmed.

The Examiner rejected claims 60, 66, 83 and 88 under 35 U.S.C. §103(a) as unpatentable over the combined teachings of Kozuka and Gupta ('843 & '796) as applied in claims 23-29, 45-50, 58, 59, 61-65, 67-82, 84-87 and 89-129, further in view of Mei or Kaschmitter or Yamazaki (076). The Examiner also rejected claims 31-44 under 35 U.S.C. §103(a) as unpatentable over the combined teachings of Kozuka and Gupta ('843 & '796) as applied to claims 23-29, 45-50 and 58-129, further in view of Mei or Kaschmitter or Yamazaki (076).

Appellant has not specifically addressed these separate rejections. However, Appellant, Brief pages 13-14, presented the following comments regarding the Mei, Kaschmitter and Yamazaki '076 references:

Mei, Kaschmitter and Yamazaki '076 do not cure the deficiencies in Kozuka, Gupta '843 and Gupta '796. The Official Action relies on Mei Kaschmitter and Yamazaki '076 to teach the use of silicon oxide layers and crystallization using laser light (p. 8, Paper No. 30). The prior art, either alone or in combination, does not teach or disclose that the discharge gas is not mixed with the reactive gas or that an overall flow rate of gases supplied in the chamber is maintained during a transition from the discharge gas to the reactive gas or from the reactive gas to the discharge gas. Since Kozuka, Gupta '843, Gupta '796 and Mei, Kaschmitter and Yamazaki '076 do not teach or suggest all the claim limitations, a *prima facie* case of obviousness cannot be maintained.

The Examiner did not rely on the Mei, Kaschmitter and Yamazaki '076 references for teaching the content and flow rate of the gases as argued by Appellant. Since the Examiner's position appears to be reasonable and has not been refuted by the Appellant, we affirm the rejections for the reasons present above and in the Answer. Accordingly, the Examiner's rejections under 35 U.S.C. § 103 are affirmed.

#### Double patenting Rejections

The examiner has rejected claims 23-29, 45-50 and 58-129 are under the judicially created doctrine of obviousness-type double patenting as unpatentable over claims 1-63, or claims 1-5, 12-21 and 27-30 of Yamazaki '147 or Yamazaki '762 in view of Gupta ('834), optionally in view of Kozuka. Answer, pp. 14-15). We affirm.



The Appellant, Brief pages 14-15, argue the obviousness-type double patenting rejections are not proper "because independent claims 23-29, 58, 64, 70, 76, 82, 87, 92 and 98 of the present invention are patentably distinct from the claims of either Yamazaki '147 or Yamazaki '762. Specifically, the independent claims of the present invention recite that an overall flow rate of gases supplied in a chamber is maintained during a transition from the discharge gas to the reactive gas or from the reactive gas to the discharge gas. Yamazaki '147 or Yamazaki '762, Gupta '843 and, optionally, Kozuka do not claim or disclose at least the above-referenced feature of the present invention."

We are not persuaded by appellant arguments. As stated above in the discussion of the § 103 rejections, persons of ordinary skill in the art at would have recognized the importance of establishing and maintaining constant plasma, and gas flow rate, during the deposition process including the transition periods for the reactive gas to the discharge gas as disclosed in Gupta '843 .

### CONCLUSION

We note that Appellant has not relied upon evidence of unexpected result in arguing the rejections of the claims.

For the foregoing reasons and those set forth in the Answer, based on the totality of the record, we determine that the preponderance of evidence weighs in favor of obviousness, giving due weight to Appellant's arguments in the briefs. Accordingly, the Examiner's rejections under 35 U.S.C. § 103 and the judicially created doctrine of obviousness-type double patenting are affirmed.

To summarize, the Examiner's rejections of claims 23-29, 45-50 and 58-129 under 35 U.S.C. § 103(a) and claims 23-29, 45-50 and 58-129 under the judicially created doctrine of obviousness-type double patenting as unpatentable are affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a)(iv)(effective Sep. 13, 2004; 69 Fed. Reg. 49960 (Aug. 12, 2004); 1286 Off. Gaz. Pat. Office 21 (Sep. 7, 2004)).

**Affirmed**

BRADLEY R. GARRIS  
Administrative Patent Judge

CHARLES F. WARREN  
**Administrative Patent Judge**

**JEFFREY T. SMITH**  
**Administrative Patent Judge**

**BOARD OF PATENT  
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